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Antibacterial Activities of different Brands of Soaps

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***Abstract:** In this study antibacterial activities of seven different brands of soaps like Hamam, Dettol, Lifebuoy, Cinthol, Margo, Himalaya and Jhonsons were checked. Different bacterial strains like Staphylococcus aureus, E.coli, Bacillus, Pseudomonas, and Klebsiella which plays their role in several skin infections are treated with the respective soaps. This was done by Agar Diffusion Method where the stock solution of 50µl were loaded into the wells of the agar plates and were labelled. All the soaps showed their certain antibacterial activity against the specific strains. The best soaps were identified by their zone of inhibition. The organisms like Pseudomonas were found to be resistant against the soap sample whereas E.coli and Staphylococcus aureus are sensitive. From this, Jhonsons soap was identified as the most effective than any other selected samples and it was followed by Himalaya which has little differences when compared with the first one.*
***Keywords:** Antibacterial activity, Bacterial strains, Agar diffusion method, Soaps.*

I. INTRODUCTION

Soap is an cleansing agent made from the salts of vegetable or animal fats, which are used for personal cleaning. The earliest recorded evidence of the production of soap-like materials dates back to around 2800 BC in ancient Babylon. A formula for soap consisting of water, alkali, and cassia oil was written on a Babylonian clay tablet around 2200 BC.

Soaps and other cleaning agents are extensively used for a very long time for different cleaning purposes (K. D. Mwambete et al., 2011). Bacteria are very diverse and present everywhere such as in soil, water, sewage, standing water and even in human body. Bacteria's that attacks on human body is of great importance with reference to health (Johnson et al., 2002). Soaps plays an important role both in cleaning and killing bacteria. To enhance their antibacterial activities some active ingredients are added to soap (Saba et al., 2009). Although fats and oils are general ingredients of soaps but some detergents are added to enhance the antibacterial activities of soaps (Friedman and Wolf, 1996).

Soap contain active ingredients that have an antibacterial activity and also the reducing power against the pyogenic skin infection caused by gram positive and gram negative species of bacteria (Richards et al., 1999). Studies have shown that soaps containing active antimicrobial ingredients remove more bacteria as compared to plain soap (Lucet et al., 2002). Transient bacteria like *Staphylococcus aureus* and *Pseudomonas aeruginosa* are deposited on the skin surface from environmental sources and cause skin infection (Higaki et al., 2000 and Fluit et al., 2001).

Sometimes, the overuse of antibacterial soaps may emerge the drug resistance micro organisms and cause the opportunistic skin infections (Poole, 2002).

On September 2, 2016, the U.S. Food and Drug Administration banned the use of 19 chemicals frequently used in "antibacterial" soaps and washes, including triclosan and triclocarbon, stating : "There is no data demonstrating that over- the-counter antibacterial soaps are better at preventing illness than washing with plain soap and water.

These include liquid, foam, gel hand soaps, bar soaps, and body washes, which contain the majority of the antibacterial ingredients with triclosan and triclocarbon.

So, these are the recent studies that have been came out relating to the antibacterial soaps. We use soap in our day to day life as a cleansing agent that helps in killing the bacteria present in our body as well as maintain our skin health. We all know that everyone prefers different types of soaps in which they select it on basis of their skin type, ingredients, action against different skin infections, etc.,

In this study, the antibacterial activity of different brands of soaps are identified. The bacterial strains used are the human pathogens present in different environments and human skin. The main purpose of this study is to evaluate the antimicrobial activity of different brands of soaps which are most commonly used by the consumers as a preffered one.

II. MATERIALS AND METHODS

A. Soap Samples

Hamam, Lifebuoy, Cinthol, Margo, Himalaya, Jhonsons, and Dettol soaps were brought from the local shops. The presence or absence of manufacturers seals, expiry dates of the soaps were noted. The ingredients of each soaps were also noted down.

B. Reference Bacterial Cultures

The reference bacterial cultures are *Staphylococcus aureus, Pseudomonas, Escherichia coli, Klebsiella, and Bacillus* were brought from the laboratories.

C. Preparation of Soap Sample

A sterile blade was used to scrap the soaps. Test sample was prepared in the concentration of 1gm soap of sample in 100ml distilled water. It is dissolved in such a condition that no foam is produced to prepare a stock solution. The stock solution were then stored in a refrigerator in well-sealed container for future use.

D. Procedure

The antibacterial activities of the soap samples were determined by the antimicrobial susceptibility testing by using standard procedure.

E. Agar Diffusion Method

About 15-20 ml of Mueller-Hinton agar was poured on sterile glass petri dishes and allowed to solidify. Test organism were swabbed onto the agar surface of each petri plates. Agar plate was punched with a sterile cork borer of 4mm size and 50µL of each sample was poured with micropipette in the bore. The plates were allowed to standby for 30 minutes. The plates were incubated at 37˚C for 24 hours.

III. RESULTS AND DISCUSSION

To determine the antimicrobial activity of the different of brands of soaps, the well diffusion method was carried out. The results are noted with a pattern form of Zone of Inhibition in which, we can demonstrate the each of the soaps antibacterial activity against the 5 different organisms which are pathogenic to skin.

The agar plates was swabbed with respective organisms along with 50µl of soap sample had been loaded into the well. After the incubation period, the results have been observed that the Jhonsons soap was found to be the most effective against the organsims when compared to the other soaps with little diferences. The zone of inhibition is measured in diameter. The antibacterial activity of Jhonsons soap showed the zone of inhibition of 1.2 dm against Pseudomonas and 2 dm against Esherichia coli and 1.8 dm against Klebsiella and 1.7 dm against staphylococcus aureus and 1.6 dm against Bacillus.

Following the Jhonsons soap, Himalaya soap was considered to be the next effective which shows the greater inhibition rate for the organism E.coli (1.7 dm) and Staphylococcus aureus (1.6 dm). The Dettol soap has also showed equal zone of inhibition when compared with Himalaya soap and it inhibits a large rate of 1.8 dm against the Bacillus. Then, followed by Margo soap which showed greater inhibition against E.coli with 1.9 dm. Hamam was in the next which has the higher resistence only against the E.coli and S.aureus. Finally, Lifebouy and Cinthol soap showed the least resistance towards the various organisms between 0.8 to 1 dm.

The Tables 1,2,3,4,5, clearly indicates the zone values of 7 soaps which are different from each other against various organisms. Here, the organism E.coli and staphylococcus aureus was found to be the most susceptible to all the soaps and this indicates that a normal soap which has been used in our daily life play an important role in killing the pathogens present in our body suface that causes the major skin infections.

So, with these identification we can now able to select the soaps that will be beneficial to our skin and also that doesn't harm the normal skin microflora. Soaps are generally used for the removal of germs and for cleaning purpose. Soaps usage is very common and now a days antibacterial soaps are very popular. But during the olden days, there are some alternatives for the soaps which was considered to be having the antibacterial properties that help in both killing the bacteria and to maintain a healthy skin. Normally we take foams as a sign of dirt getting washed off. That's the reason we overuse soap than the required level. There are few alternatives like Gram flour mixed with curd or lemon and use it instead of soap. Overtime, it removes those tiny freckles and tans as well. It also removes oiliness from face. If the skin is dry, then add a drop of any essential oil such as Tea tree oil (good for pimples), Jojoba or even coconut oil helps. All these things takes time to work and eventually will get used to this rather than soap (KalaivaniVelusamy., 2016).

Table 1. Zone of inhibition of 7 different soaps against *E.coli*

[1] Organism	[2] Soap sample	[3] Concentration	[4] Zone of inhibition
[5]	[7] Jhonsons	[8] 50µl	[9] 2 dm
	[10] Himalaya	[11] 50µl	[12] 1.7 dm
[6] E.coli	[13] Dettol	[14] 50µl	[15] 1.7 dm
	[16] Cinthol	[17] 50µl	[18] 1.8 dm
	[19] Lifebuoy	[20] 50µl	[21] 1.8 dm
	[22] Margo	[23] 50µl	[24] 1.9 dm
	[25] Hamam	[26] 50µl	[27] 1.7 dm

Table 2. Zone of inhibition of 7 different soaps against Staphylococcus aureus

Organism	Soap sample	Concentration	Zone of inhibition
Staphylococcus aureus	Jhonsons	50µl	1.7 dm
	Himalaya	50µl	1.6 dm
	Dettol	50µl	1.3 dm
	Cinthol	50µl	1.0 dm
	Lifebuoy	50µl	1.4 dm
	Margo	50µl	1.2 dm
	Hamam	50µl	1.4 dm

Table 3. Zone of inhibition of 7 different soaps against Bacillus

Organism	Soap sample	Concentration	Zone of inhibition
Bacillus	Jhonsons	50µl	1.6 dm
	Himalaya	50µl	1.0 dm
	Dettol	50µl	1.8 dm
	Cinthol	50µl	0.9 dm
	Lifebuoy	50µl	1.0 dm
	Margo	50µl	1.1 dm
	Hamam	50µl	0.8 dm

Table 4. Zone of 7 different soaps against Pseudomonas

Organism	Soap sample	Concentration	Zone of inhibition
Pseudomonas	Jhonsons	50µl	1.2 dm
	Himalaya	50µl	1.0 dm
	Dettol	50µl	1.0 dm
	Cinthol	50µl	1.0 dm
	Lifebuoy	50µl	0.8 dm
	Margo	50µl	1.1 dm
	Hamam	50µl	1.2 dm

Table 5. Zone of inhibition of 7 different soaps against klebsiella

Organism	Soap sample	concentration	Zone of inhibition
Klebsiella	Jhonsons	50µl	1.8 dm
	Himalaya	50µl	1.3 dm
	Dettol	50µl	0.9 dm
	Cinthol	50µl	1.0 dm
	Lifebuoy	50µl	0.8 dm
	Margo	50µl	0.9 dm
	Hammam	50µl	0.7 dm

IV. CONCLUSION

Instead of soaps, the alternative techniques which were used in the olden days are considered to be the olden techniques and now a days modern soaps have been emerged taking care of both problems like killing the bacteria present in our body and maintain the skin beauty as well. So, from this study, we identified that all the soaps had antibacterial activity. In this, Jhonson's soap is considered to be best all and showed greater antibacterial activity than any other selected soaps. Himalaya soap is considered as the second number followed by Dettol, Margo and Hamam. Cinthol and Lifebuoy has the least antimicrobial activity.

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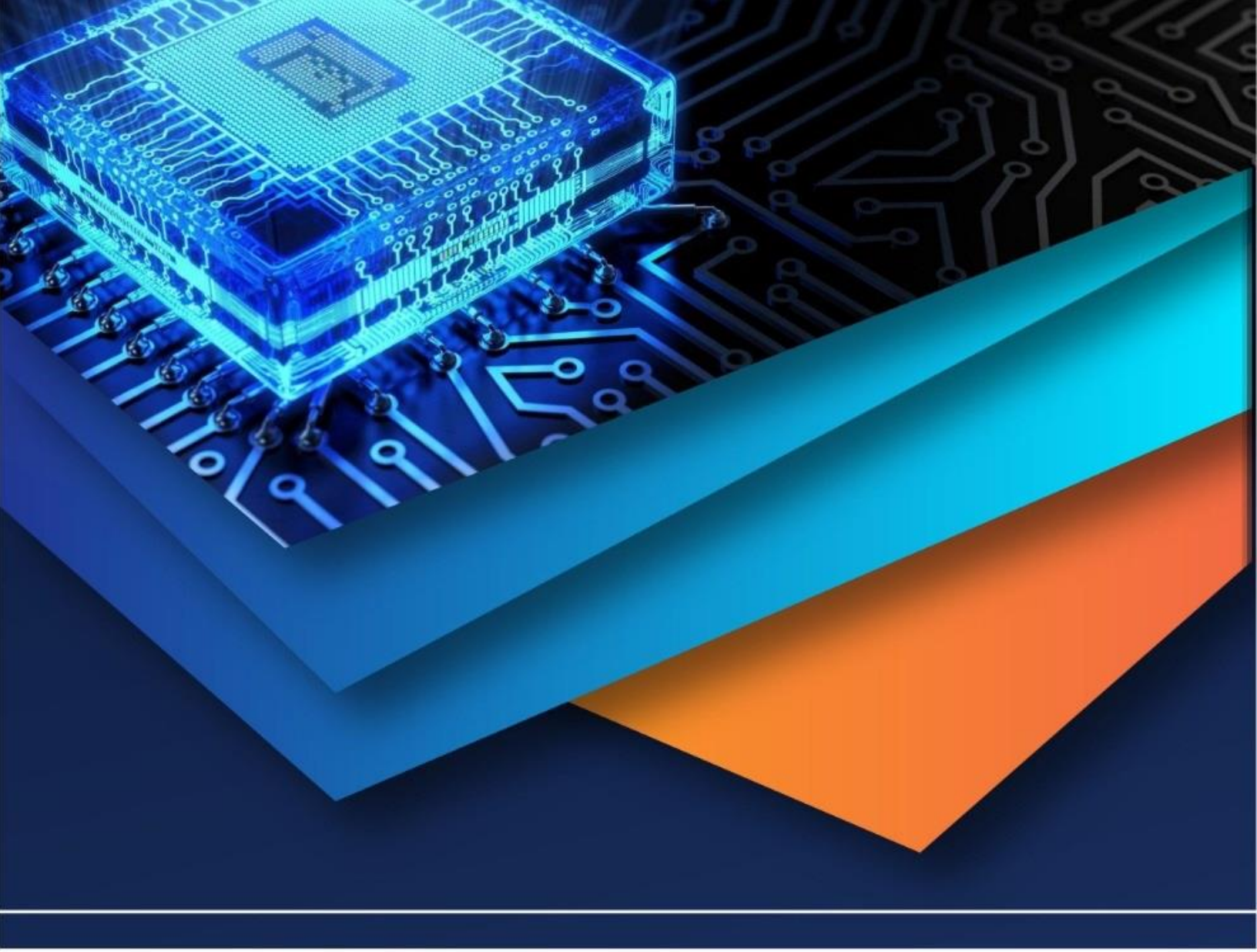

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